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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Young Nam Kim

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EXAMINER

MARTINEZ, BRITTANY M

ART UNIT

PAPER NUMBER

1793

MAIL DATE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/580,730	Applicant(s) KIM, YOUNG NAM	
	Examiner BRITTANY M. MARTINEZ	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 May 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/23/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Citation to the Specification will be in the following format (S. p. #, P) where # denotes the page number and P is the paragraph number. Citation to U. S. Patent literature will be in the format (Inventor, c. #, l. LL) where # is the column number and LL is the line number. Foreign patent literature will be in the format (Inventor, P) where P denotes the paragraph number.

Status of Application

Claims 1-15 are pending in the instant application and have been examined.

Priority

1. The instant application is a national stage entry of PCT/KR04/03109, filed November 29, 2004, which claims priority from Korean Patent Application No. 10-2003-0086463, filed December 1, 2003. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a

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separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Drawings

1. The drawings are objected to because Figures 1-3 and 5-6 are not of sufficient quality for reproduction in a printed patent document and Figure 4 is labeled in Korean. Refer to 37 CFR 1.84(b). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claims 1-2, 8-9, and 11-15** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. With regard to **Claim 1**, "in the presence or absence of a catalyst" is indefinite because if a catalyst is not present in the reaction, it would be absent, and vice versa.

5. With regard to **Claim 2**, "with the carbon source or separately" is indefinite because it would seem that if the water was not supplied with the carbon source, it would be supplied separately, and vice versa.

2. A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte*

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Hasche, 86 USPQ 481 (Bd. App. 1949). Regarding **Claims 8 and 14**, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

3. With regard to **Claim 9**, it is unclear whether "oxides, nitride, borides, fluorides, bromides" refers to metal oxides, metal nitrides, metal borides, metal fluorides, and metal bromides, or if the limitation refers to any oxide, nitride, boride, fluoride, or bromide.

4. **Claim 11** recites the limitation "the catalyst nanoparticles" in the 2nd line of the claim. There is insufficient antecedent basis for this limitation in the claim.

5. With regard to **Claim 12**, it is unclear whether just the fluorocarbon-based surfactants can be cationic, anionic, nonionic, or amphoteric, or whether the hydrocarbon-based and silicon-based surfactants may also be cationic, anionic, nonionic, or amphoteric.

6. **Claim 13** recites the limitations "said solvents" and "said surfactants" in the 2nd-3rd lines of the claim. There is insufficient antecedent basis for these limitations in the claim.

7. With regard to **Claim 13**, "saturated or unsaturated" is indefinite because it seems that an aliphatic hydrocarbon would either be saturated or unsaturated.

8. With regard to **Claim 15**, the limitation "selected from...and..." utilizes improper Markush terminology.

Claim Rejections - 35 USC § 102/103

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. **Claims 1-5 and 13** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Masahiro et al. (JP 2002-037614).

10. With regard to **Claims 1 and 13**, Masahiro discloses a method for preparing high purity carbon nanotubes in which the carbon nanotubes are prepared by the recombination of carbons generated from a carbon source such as polyethylene, fullerene, an organic solvent, or amorphous carbon in the presence of a catalyst, the

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method being characterized in adding water into the reaction system (Masahiro, "Abstract").

11. With regard to **Claim 2**, Masahiro discloses the water supplied into the reaction system with the carbon source (Masahiro, "Abstract").

12. With regard to **Claim 3**, Masahiro discloses water present in an amount of 0 to 10 wt% based on the total weight of the carbon source (Masahiro, 0017).

13. With regard to **Claim 4**, Masahiro discloses nickel as the catalyst (Masahiro, "Abstract").

14. With regard to **Claim 5**, Masahiro discloses the graphite as a carbon source being vaporized by arc-discharge (Masahiro, 0006).

15. **Claims 1-5 and 13** are also obvious over Masahiro because anticipation is the epitome of obviousness.

16. **Claims 1-6 and 10-15** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ago et al. (JP 2001-062299).

17. With regard to **Claims 1 and 13**, Ago discloses a method for preparing high purity carbon nanotubes in which the carbon nanotubes are prepared by the recombination of carbons generated from a carbon source such as a hydrocarbon in the presence of a catalyst, the method being characterized in adding water into the reaction system (Ago, "Abstract;" 0005-0006 and 0011-0013). Further, with regard to **Claim 13**, Ago discloses that the carbon source can be selected from the group consisting of

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solvents, carbon monoxide, saturated or unsaturated aliphatic hydrocarbons having 1 to 6 carbon atoms, and aromatic hydrocarbons having 6 to 10 carbon atoms (Ago, 0013).

18. With regard to **Claim 2**, Ago discloses the water supplied into the reaction system with the carbon source (Ago, 0005).

19. With regard to **Claim 3**, Ago discloses water present in an amount of 0.1 to 10 wt% based on the total weight of the carbon source (Ago, 0005).

20. With regard to **Claim 4**, Ago discloses transition metal catalysts (Ago, 0005).

21. With regard to **Claim 5**, Ago discloses a variety of carbon sources being vaporized by a variety of conventional reaction methods, such as laser ablation (Ago, 0013-0014).

22. With regard to **Claim 6**, Ago discloses the hydrocarbon as a carbon source being supplied in gas phase (Ago, 0013-0014).

23. With regard to **Claim 10**, Ago discloses the water added in the form of water-in-oil or oil-in-water emulsion with the hydrocarbon used as a carbon source in the presence of a surfactant (Ago, 0004-0006).

24. With regard to **Claim 11**, Ago discloses the water-in-oil or oil-in-water emulsion comprising the catalyst nanoparticles which are dispersed in the emulsion medium or encapsulated inside particles of the water-in-oil or oil-in-water emulsion (Ago, 0004-0006).

25. With regard to **Claim 12**, Ago discloses the surfactant being hydrocarbon-based surfactants being cationic or anionic (Ago, 0006).

26. With regard to **Claim 14**, Ago discloses the hydrocarbon being selected from the group consisting of aromatic hydrocarbons such as benzene, toluene or xylene (Ago, 0013).
27. With regard to **Claim 15**, Ago discloses an optional reaction gas selected from the group consisting of H₂ and H₂S being supplied (Ago, 0014).
28. **Claims 1-6 and 10-15** are also obvious over Ago because anticipation is the epitome of obviousness.

Claim Rejections - 35 USC § 103

2. **Claims 7-9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ago et al. (JP 2001-062299) as applied to **Claim 1** above, and further as discussed below.
3. With regard to **Claim 7**, Ago discloses the catalyst being supplied in the form of a nanoparticles colloid solution (Ago, 0005-0006).
4. With regard to **Claim 8**, Ago discloses the colloid solution being a solution of the catalyst nanoparticles which are dispersed in a solvent selected from the group consisting of water, a nonpolar organic solvent, such as an aromatic organic solvent such as benzene, toluene or xylene, and an aliphatic organic solvent such as hexane, heptane or octane, in the presence of a surfactant (Ago, 0005-0006).
5. With regard to **Claim 9**, Ago discloses the catalyst in the form of nanoparticles being selected from the group consisting of metal element, oxides, and borides of metal (Ago, 0005).

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6. Ago does not explicitly disclose the catalyst being supplied continuously or intermittently (**Claim 7**).

9. With regard to **Claim 7**, supplying the catalyst continuously or intermittently is a matter of process design and optimization, and thus, would have been obvious to one of ordinary skill in the art at the time of the invention.

Conclusion

1. No claim is allowed.

2. In general, prior art renders the claimed invention anticipated and obvious.

3. Applicant is required to provide pinpoint citation to the specification (i.e. page and paragraph number) to support any amendments to the claims in all subsequent communication with the examiner. **No new matter will be allowed.**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRITTANY M. MARTINEZ whose telephone number is (571) 270-3586. The examiner can normally be reached Monday-Friday 9:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached at (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Wayne Langel/
Primary Examiner, Art Unit 1793

BMM

/Brittany M Martinez/
Examiner, Art Unit 1793